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Serial No. 09/938,453

Remarks

Claims 1-42 were pending in the application. Claims 4-6, and 22 are hereby canceled. Therefore, claims 1-3, 7-21, and 23-42 remain pending in the application.

Claims 16, 25-28, 30-34, and 40 were indicated to contain allowable subject matter but were objected to as being dependent upon a rejected base claim. They would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 30 and 32 have been so rewritten in independent form, and hence are allowable. As a result, claim 31, which depends from claim 30, and claim 33 and 34, which depend from claim 32, are also allowable.

Claims 3, 6-7, and 18-41 were objected to because of various informalities.

Claims 27 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

Claims 1-41 are rejected under 35 U.S.C. 112, second paragraph.

Claims 1-7, 9-10, 15, 17-19, 23-24, 29, 35-39, and 41-42 are rejected under 35 U.S.C. 102(e) as being unpatentable over United States Patent No. 6,785,341 issued to Walton et al. on August 31, 2004.

Claims 8, 11-12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. view of United States Patent No. 6,785,341 issued to Padovani et al. on June 3, 2003.

Claims 13-14 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. in view of United States Patent No. 6,731,700 issued to Yakhnich et al. on May 4, 2004.

Each of the various rejections and objections are overcome by amendments that are made to the specification, drawing, and/or claims, as well as, or in the alternative, by various arguments that are presented.

Any amendments to any claim for reasons other than as expressly recited herein as being for the purpose of distinguishing such claim from known prior art are not being made with an intent to change in any way the literal scope of such claims or the range of equivalents for such claims. They are being made simply to present language that is better in conformance with the form requirements of Title 35 of the United States Code or

Serial No. 09/938,453

is simply clearer and casier to understand than the originally presented language. Any amendments to any claim expressly made in order to distinguish such claim from known prior art are being made only with an intent to change the literal scope of such claim in the most minimal way, i.e., to just avoid the prior art in a way that leaves the claim novel and not obvious in view of the cited prior art, and no equivalent of any subject matter remaining in the claim is intended to be surrendered.

Claim Objections

Claims 2-41 were objected to because of the following various informalities.

Except as noted hereinbelow, amendments have been made to the claims in line with the Office Action's suggestions to correct the informalities.

Claim 4 has been canceled.

With regard to the use of "the time domain" etc. it is noted that items that inherently exist need not be explicitly introduced and may be referred to directly with proper English using the article "the". Thus, it is proper refer to "the time domain" or "the discrete frequency domain". These are known domains that inherently exist. To recite "a time domain" or "a discrete frequency domain" would be incorrect English and confusing to a reader.

Rejection Under 35 U.S.C. 112, First Paragraph

Claims 27 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The accidentally inserted and clearly extraneous soft bit mapper has been eliminated from claim 27. Thus, the elements remaining in claim 27 comply with the enablement requirement.

Rejection Under 35 U.S.C. 112, Second Paragraph

Claims 1-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Except as noted hereinbelow, amendments have been made to the claims in line with the Office Action's suggestions to correct the informalities.

Serial No. 09/938,453

Regarding claim 1, line 7 has been amended to indicate that receive antennas are being referred to.

Regarding the allegation of lack of antecedent basis for the term "The invention", applicant believes that the word invention, as used, is proper in dependent claims. Thus, this objection is respectfully traversed.

Applicants respectfully point out there is no requirement to point out applicants' invention in the manner suggested by the Office Action. Instead, since 37 C.F.R. 1.75 states that the claim points out the subject matter that applicant regards as his invention, it is necessary that a claim define an invention, and so it is often said, "the claim is the invention". Thus, the language objected to is clear and legally correct, since only dependent claims employ the language and each refers back to another claim that defines an invention. Moreover, many patents have issued with the exact language objected to by the Office Action, indicating that the United States Patent and Trademark Office regards such language as an acceptable form. See for example, the relatively recently issued United States Patents Nos. 5,764,748, 5,784,448, 5,767,751, and 5,767,825. Note that it is not required that the exact same word be used in order to have proper antecedent basis. Rather, what is required is that it be clear what is being referred back to. Thus, the term "the invention" has proper antecedent basis, since it refers back to the entirety of a specific identified claim, which is a definition of an invention.

Similarly, in this regard, it is noted that items that inherently exist need not be explicitly introduced and may be referred to directly with proper English using the article "the". Thus, it is proper refer to "the time domain" or "the discrete frequency domain". These are know domains that inherently exists. To recite "a time domain" or "a discrete frequency domain" would be incorrect English and confusing to a reader.

Regarding the rejection of claim 12, applicants do not understand the rejection, and further review of the claim leads applicants to believe the claim is clear. If the Examiner wishes to further pursue this ground of rejection, he is requested to further clarify what the problem is, which may be achieved by telephoning applicants' undersigned representative.

Serial No. 09/938,453

Regarding claim 31 and 33, M is the number of signal sources and N is the number of signal detectors. Note that there are a plurality of signal sources and a plurality of signal detectors recited in claim 30. Thus, one of ordinary skill in the art would understand, without more, that N and M are integers equal or greater than 2. Hence, nothing further need be added to the claims.

As regard to "the equalization", again English dictates the use of "the", in the same manner that line 19 refers to "the Hermetian transpose", which was not rejected. As to X note that it is a placeholder variable, and is not itself a value in the equation. In other words, it is used as a stand in for anything that has a superscripted H in it. One of ordinary skill in the art would readily understand this notation. This applies to claim 40 as well.

Regarding claim 33, "all said signal detectors" clearly refers back to all of the signal detectors in the plurality of signal detectors.

Regarding claim 36 "the channels" are those channels that inherently exist between each of the signal sources and signal detectors. This is clear to one of ordinary skill in the art. To attempt to express this concept otherwise is likely to considerably lengthen claim 36 and make it considerably more confusing.

Art-Based Rejections

Rejection Under 35 U.S.C. 102(e)

Claims 1-7, 9-10, 15, 17-19, 23-24, 29, 35-39, and 41-42 are rejected under 35 U.S.C. 102(e) as being unpatentable over United States Patent No. 6,785,341 issued to Walton et al. on August 31, 2004.

This ground of rejection is respectfully avoided for the following reasons.

Applicants have amended the independent claim 1 to require that the determining of the joint equalizer solution be performed at least partly in the discrete frequency domain. This corresponds to former claim 5, now canceled. The rejection of claim 5 cited column 15, lines 40-53 and demodulators 154 (FIG. 5) of Walton et al. However, demodulators 154 perform their operation prior to the determination of the joint

Serial No. 09/938,453

equalizer solution. Thus, they are not at all involved in determining the joint equalizer solution.

Note that demodulators 154 are also called a "front end processor" (see column 15, lines 27-28) and each of demodulators 154 conditions (e.g., filters and amplifies) a respective received signal, downconverts the conditioned signal to an intermediate frequency or baseband, and digitizes the downconverted signal to provide samples. Each demodulator 154 may further demodulate the samples with a received pilot to generate a stream of received modulation symbols, which is provided to RX MIMO/data processor 156. Likewise, when OFDM is employed for the data transmission, each demodulator 154 must reverse the processing performed by modulator 122 of FIG. 3. To that end, there is some work done in the frequency domain, as described in column 15, lines 53. However, most importantly, at the end of all the processing in demodulator 154 the output of demodulator 154 is a number of modulation symbol streams. (See column 15, lines 48-53 and lines 54-57).

It is received modulation symbols that are supplied to determine the joint equalizer solution in Walton et al. The frequency domain processing, if any, performed in demodulator 154 is independent of and not related to the development of the joint equalizer solution. Hence applicants' amended claim 1 (and former claim 5) is allowable over Walton et al. under 35 U.S.C. 102(e).

All of the dependent claims that depend from claim 1 are likewise allowable.

Since independent claim 42 has been amended with a similar limitation as that added to claim 1, claim 42 is allowable for the same reasons that claim 1 is allowable.

Rejection Under 35 U.S.C. 103(a)

Claims 8, 11-12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. view of United States Patent No. 6,785,341 issued to Padovani et al. on June 3, 2003.

This ground of rejection is respectfully avoided for the following reasons.

With regard to claims 11-12, applicants note that they are dependent on amended claim 1, which is allowable over Walton et al. Since the Office Action does not cite Padovani et al. as teaching that determining a joint equalizer solution be performed at

Serial No. 09/938,453

least partly in the discrete frequency domain, and applicants agree it does not, both Walton et al. and Padovani et al. separately, and hence in combination, lack this element and cannot render applicants' claim 1 obvious. Therefore, since claims 11 and 12 depend from an independent claim that is allowable over the combination of Walton et al. and Padovani et al., claims 11 and 12 are allowable over the combination under 35 U.S.C. 103.

As to claim 8, it has now been amended to be in independent form. Applicants note that the straightforward, and hence obvious, way to combine Walton et al. and Padovani et al. would be to perform the despreading first and then provide the despread and demodulated symbols to the joint equalizer, so that equalization is performed on the despread symbols. Indeed, this is exactly what the Office Action suggests in its proposed combination.

However, performing despreading first, and then equalizing despread symbols, is not what is called for in applicants' claim 8. Rather, claim 8 requires that the samples of the spread symbols, i.e., the samples before despreading, first be equalized, and only thereafter are the equalized samples despread. Indeed, this is the exact opposite of the proposed combination of the Office Action. This can be seen from the fact that it is the equalized samples that are despread according to the recitation of claim 8. Equalized samples are not developed by the proposed combination, and indeed the concept of equalized samples does not exist in the proposed combination. Furthermore, doing the equalization on the samples first is no mere design choice, since it provides the technical advantage that all of the samples are equalized without requiring any knowledge of the spreading code.

Thus the proposed combination of Walton et al. and Padovani et al. does not teach or suggest applicants' invention as recited in claim 8, and hence claim 8 is allowable over the proposed combination under 35 U.S.C. 103.

Independent claim 18 has been amended to include the limitation of originally filed claim 22. By having the despreader interposed between the joint equalizer and the soft bit mapper, it is clear that the joint equalizer operated on spread samples, rather than symbols. Hence, claim 18 is allowable for the same reasons as is amended claim 18.

Serial No. 09/938,453

For the same reasons, all of the dependent claims that depend from claim 18 are allowable as well.

Claims 13-14 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walton et al. in view of United States Patent No. 6,731,700 issued to Yakhnich et al. on May 4, 2004.

This ground of rejection is respectfully traversed for the following reasons.

Each of independent claims 13-14 and 20-21 contains a limitation similar to that of claim 1 which requires that the determining of the joint equalizer solution be performed at least partly in the discrete frequency domain. This is not taught or suggested by Walton et al., as indicated hereinabove. Nor is it taught or suggested by Yakhnich et al., which is merely cited for the proposition of the use of spatial whitening or the use of APP metric processing, about which at this time applicants express no opinion. Since the proposed combination lacks applicants' claims' 13-14 and 20-21 requirement that determining of the joint equalizer solution be performed at least partly in the discrete frequency domain, these claims are allowable over the proposed combination under 35 U.S.C. 103.

Serial No. 09/938,453

Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

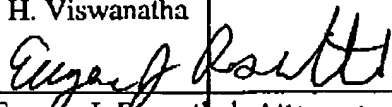
If, however, the Examiner still believes that there are unresolved issues, he is invited to call applicant's attorney so that arrangements may be made to discuss and resolve any such issues.

In the event that an extension of time is required for this amendment to be considered timely, and a petition therefor does not otherwise accompany this amendment, any necessary extension of time is hereby petitioned for, and the Commissioner is authorized to charge the appropriate cost of such petition to the **Lucent Technologies Deposit Account No. 12-2325**.

Respectfully,

H. C. Huang
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By


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Lucent Technologies Inc.

Date: 7/7/06

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